DOCUMENT RESUME

ED 037 079 EM 007 835

AUTHOR Connor, D. V.
TITLE Educational Technology in Australia and New Zealand. Occasional Publication Number One.
INSTITUTION New South Wales Univ., Kensington (Australia).
PUB DATE Aug 67
NOTE 35p.

EDRS PRICE EDRS Price MF-$0.25 HC-$1.85
DESCRIPTORS *Comparative Education, *Educational Research, *Educational Technology, Foreign Culture, National Surveys, Program Descriptions

ABSTRACT

The Australian and New Zealand educational systems are currently developing at a rapid rate. The aim of this paper is to trace the emergence and growth of educational technology in the unique conditions of Australia and New Zealand, to outline and evaluate previous developments and current applications, and to discern trands and suggest the implications of various educational procedures in Australasia. The emphasis is on applications to formal education from any field of scientific endeavor. The applications considered range from the use of telephone lines and pedal radio in the Australian outbacks to the use of computers in the densely populated metropolitan areas. Examples are given of Australia's attempts to use technology to assist the educational problems of other countries as well as her own. (Author/JY)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

EDUCATIONAL TECHNOLOGY IN AUSTRALIA AND NEW ZEALAND.

D. V. Connor.

ED037079

OCCASIONAL PUBLICATION No.1
AUGUST 1967.

EM007835

Educational Research Unit
THE UNIVERSITY OF NEW SOUTH WALES

ED037079

EDUCATIONAL TECHNOLOGY IN AUSTRALIA AND NEW ZEALAND[1]

INTRODUCTION

In common with the educational systems of most western countries, the Australian and New Zealand educational systems are currently developing at a rapid rate. The period is one of both expansion to meet current needs, and re-evaluation and re-organisation to meet present and future commitments. These developments are occurring against a background of, and concurrently with, a scientific and technological advance which is greatly affecting the values and practices of the educational systems themselves[2], particularly in the contributions that it is making to teaching and learning procedures. The aim of this chapter is to trace the emergence and growth of this educational technology in the unique conditions of Australia and New Zealand; to outline and evaluate previous developments and current applications, and to discern trends and suggest implications for various educational procedures in Australasia.

To act as a guide in delimiting the scope of this chapter and in selecting material, Carpenter's [3] definition of educational technology will be accepted. The emphasis therefore will be on applications to formal education from any field of scientific endeavour. In the case of Australia, this will range from the use of telephone lines and pedal radio in the heart of the Australian outback to the use of the most modern computers in the largest metropolis in the Southern Hemisphere. Paradoxically, the selection will also include instances of the use of mass media to span empty spaces and the use of mass and individualising devices to cope with dense concentrations of students. Finally, examples will be given of Australia's attempts to use this technology to assist the educational problems of other countries as well as her own.

BACKGROUND FACTORS

In order to appreciate fully the impact of technology on educational practices in Australasia, it is necessary to take into account certain influences that have shaped these systems and account for their present operation. Historically, the education systems of Australia and New Zealand have their roots in the British-European philosophical and cultural approach, but increasingly an American influence has been felt. The current position in Australasia might be said to be half way, as is its geography, between the British and American approaches. This is a significant fact, as we shall see later, in the development of a technology of education in this area.

---

(1) A pre-print of a section on a World Survey of Educational Technology to be published by Columbia University Press, New York.

(2) Some of these influences in the Australian setting are outlined in "Educating for Tomorrow", Australian College of Education, Cheshire, 1963.

(3) Carpenter, C.R. (1963), "New Technologies in Formal Education: The Mass Media of Communication", Paper to XVIIth International Congress of Psychology, Washington, D.C.

ED027019

With particular respect to their geography, Australia and New Zealand have been remote and isolated from both the above influences and, because of this and their position in the South East Asian area, they have developed some unique solutions of their own to their educational problems, particularly with regard to educational technology. Even more important in this respect are the geographical conditions internal to these countries as these conditions have demanded particular solutions.

Lastly, there are changing economic conditions that have to be taken into account. The post-war period is one of a rapidly expanding economy and a change from primary to secondary industry, with a reported annual industrial growth of at least 10 per cent (1). All of the influences so far mentioned have had their impact on the structure, organisation, development and functioning of the systems themselves. Outlines of these educational systems, and a survey of the influences, together with their effects on the educational systems, have been well documented by various agencies (2).

The Emergence of an Educational Technology

Since the education systems of Australia and New Zealand were so closely tied to that of Britain in the early stages, the effects of the first industrial revolution on the community and school systems were directly passed on. At the turn of the century, and with the growth of church and secular educational systems, the internal factors of geography, the local society, and economics began to assert their influence. Such technology as there was up to this time hardly touched the school systems, except for printed materials, and simple visual and graphic aids. However, with the coming of the slide projector, film and radio, the school systems adapted them to their peculiar circumstances and have since provided some unique contributions to communications in a difficult setting, particularly in the use of radio. This development continued after the depression in the thirties and the wars of the forties, when the contributions of science and technology coincided with an unprecedented period of educational expansion and the "newer" media were added to conventional audio visual aids. It was retarded somewhat, however, by the twin problems posed by increasing numbers and an increased demand for education in the post war years.

---

(1) Australian Education Council, "A Statement of Some Needs of Australian Education", Report of the State Ministers of Education, 1963.

(2) For comprehensive coverage of these background factors to the Australian and New Zealand systems, see (a) Unesco, World Survey of Education, Vols. II and III (1958, 1961); (b) Unesco series in Compulsory Education, "Compulsory Education in Australia" (Revised Edition), Paris, 1962; "Compulsory Education in New Zealand", Paris, 1952; (c) International Bureau of Education "International Yearbook of Education", Vols. 23-26, Geneva, 1959-1964; (d) Commonwealth Bureau of Census and Statistics, "Yearbook of the Commonwealth of Australia", No. 51, 1965, Ch. XIX; (e) Yearbook of Education, Evans Bros., London, various sections, 1949-66.

More recently, however, it is symptomatic that most of the surveys of the Australian and New Zealand education systems (1) have stressed the increased industrial potential of the countries and the need for increased attention to the education of scientists and technologists. Though It is happening gradually, there are signs in the increasing use of the "newer" media that this emphasis will further permeate the educational systems and carry over increasingly into their practices and procedures.

The Agencies of Development

The acceptance and development of an educational technology in Australasia has depended very much on the way the various educational systems themselves have evolved. In the case of Australia, a number of highly centralised State secular systems and private (denominational) systems have arisen and operate over a wide and sparsely populated area. This has greatly influenced the applications of educational technology in the school systems. On the one hand, it has led to extreme difficulties in the production, distribution, and application of audio visual and communication media. On the other hand, in trying to meet the unusual environmental conditions, some striking examples of their use have been provided and will be discussed later.

The Australian Commonwealth (Federal) Government, through its agencies, has a specific role internal and external to Australia, and because of its national position, has made a large contribution to implementing educational radio and television. A division of labour has occurred between State and Commonwealth Governments in the provision of "conventional" and "newer" media. The latter, involving radio and television, required capital expenditure on a national scale and has been developed and operated by the Australian Broadcasting Control Board and the Postmaster General's Department. The conventional media of audio visual aids and films are handled by the Education Departments of the various State Governments.

The universities, the Australian Council for Educational Research, and the professional and academic educational organisations have been concerned more with development and evaluation of the various techniques. The universities, with their greater resources of staff and equipment, have become the major users of techniques and equipment for both teaching and research.

The special characteristics of the settings and functioning of the Australian and New Zealand education systems have dictated different developments in

---

(1) These have been carried out mainly at the national level and mainly in relation to Tertiary Education. See (a) Commonwealth of Australia, "Tertiary Education in Australia", Report of the Committee on the Future of Tertiary Education in Australia, 1964; (b) Australian Universities' Commission, "Report of the Committee on Australian Universities", Commonwealth of Australia, 1957; (c) Report of the Committee on New Zealand Universities, Govt. Printer, Wellington, 1959

the various media and techniques. A uniform development of all aspects of the technology in all the Australian States is also not to be expected. Special materials and methods have been developed in some cases, and there are variations in organising and administering the services, and in evaluating the effectiveness of different techniques. With the above considerations as a background, details of the various media and techniques will now be reviewed.

DEVELOPMENTS IN AUSTRALIA

Sources of Information

The first fact that presents itself in an attempt to review developments in this field is the lack of documentation. The reasons for this are many and easily understood. Generally it is a product of the paucity of activities and of agencies to report such activities, especially in the early stages of growth of a developing system. Earlier activities in educational technology concerned individual school applications rather than the later mass-media approach. These applications were informal, sporadic and ad hoc, and were reported mainly in annual and administrative reports(1). More recently, with more sustained and systematic work and with the growth of reporting agencies, the literature has become more readily accessible. However, with many of the conditions mentioned above still operating, and with developments still largely in the exploratory and experimental stage, original data, "internal" to Australia, are hard to unearth. The main sources are still reports of the various bodies concerned, articles in Educational Journals and reviews(2) and in university theses. Much of the information has come from national agencies' reports for international bodies and conferences external to Australia(3), and these are mainly descriptive, factual and laudatory. They are also predominantly concerned with the "newer mass media".

---

(1) See Reports of the Ministers of Education in all the Australian States, and the Education Gazettes of the Education Department; of the Australian Council for Educational Research; of the various universities of Australia; of the Commonwealth Office of Education; and of various Committees of Enquiry set up by the Commonwealth Government to examine tertiary education in Australia.

(2) For example, the Australian Journal of Education; the Review of Education in Australia, published by the A.C.E.R., Melbourne; the Annual Reports of the Australian Broadcasting Control Board and Broadcasting Commission; Education News, published by the Commonwealth Office of Education; and Visual Aids Review, published by Department of Audio Visual Aids, University of Melbourne.

(3) See International Conference of Broadcasting Organisations on Sound and T.V. School Broadcasting, Proceedings, N.H.K., Tokyo, 1964; Great Britain, Department of Education and Science, Reports of the Commonwealth Education Conferences at Oxford, New Delhi, Ottawa; Association of Commonwealth Universities, Commonwealth Universities Yearbooks, London, 1959-66.

A Survey of the Media

In terms of Schramm's[1] "generations" of communication media, this survey will deal with the third generation of still and movie projectors, tape recordings, radio and television, leaving the earlier generations of maps, charts, blackboards and books to the period when Australia was not yet a nation. However, it will be useful to divide the period under review into the (a) conventional, and (b) newer media.

(a) The Conventional Media

Up to the pre World War I years, the applications of technology to education were confined largely to the use of the lantern slide, epidiascope, still and movie projector, and the beginnings of organised educational radio broadcasts. It was a state of passing from the individualised use of audio visual aids to the use of the mass media of film and radio for educational purposes.

Audio Visual Aids

Two reviews of audio visual education in the period immediately after the Second World War showed that the use of audio visual aids had passed the novelty stage and that they were being integrated into school practices. The earlier review[2] gives the position up to 1947 with regard to its organisation, accommodation, finance, production, distribution and use in schools and in teacher training. The later review[3] shows that in the early post war period there was an increasing interest in the use of visual aids due to the experience gained in the Armed Services training schemes and in adult education in the Armed Forces. Each State Department of Education had established a visual education centre to supply and advise on the use of visual aids, to produce slides and film strips, and to maintain a borrower's library of 16mm films. The Commonwealth Government entered this field by subsidising these centres and by establishing the National Film Council and the film division of the Commonwealth Government. The projection equipment was purchased by the schools, under subsidy from the State Governments, and was installed and maintained by the latter. Advisory and research officers were appointed, and in some cases film and visual aids were integrated with school radio broadcasts. In-service courses in the use of visual aids were established and training institutions introduced courses in visual aids.

---

(1) Schramm, W. (1963), "The Newer Educational Media in the United States" in "New Methods and Techniques in Education", Educational Studies and Documents No. 48, Unesco, pp.5-17.

(2) See "Visual Aids in State Education Departments of Australia", Commonwealth Office of Education, Bulletin No. 4, 1947.

(3) See "Review of Education in Australia, 1948-54" A.C.E.R., Melbourne, 1955, and "Developments in Australian Education, 1951-52", a Report prepared by the Commonwealth Office of Education for the International Conference on Public Education, Geneva, in Education News, 8, 10, 1952.

The next phase in the development of audio visual education was one of special effort on the experimental use of sound film. An early study by the Commonwealth Office of Education(1) had shown the special place of discussion in the use of educational film, and the Research Branches of the Education Departments began to carry out evaluation studies. Radford and Pratt(2) reviewed the research on audio visual aids carried out up to 1956 and reported studies(3) on the need for follow up work in using film and on the use of colour film. In a further review, Radford(4) noted that, while films had value in relating school studies to life and in establishing and raising standards of judgement, etc., in terms of their effective use, mechanical invention had outstripped the development of methods in this as well as in other applications of educational technology.

The third phase in the use of conventional audio visual aids shows a vast increase in their use due to increased funds and availability of still and movie projectors, tape recorders and film. The visual aids centres of the Education Departments have grown and developed into centres for the production and evaluation of a wide variety of audio visual devices and aids(5). Certificates of Proficiency in Visual Education have been set up, lecturers in Visual Aids appointed to the Teachers' Colleges, and courses in film appreciation established. At the tertiary level, a survey of audio visual facilities(6) revealed that Departments of Audio Visual Aids had grown up as a service to university staffs and as production and research centres for educational media. Amongst the most recent developments in this field are the increased use of 8mm closed loop films and overhead projectors, both of which are still in the pioneering stage but are seen to have great potential.

Early School Broadcasting

With regard to school broadcasts, this was beyond the resources of the State

---

(1) Commonwealth Office of Education, "The Effective Use of Sound Films", Education News, 2, 7, 1950

(2) Radford, W.C. & Pratt, J.J. (1957), "Educational Research on Problems of the Primary School 1950-56", Australian Journal of Education, 1, 2, pp. 124-134.

(3) See Smart, A.J. (1949), "Self-Delusion Through the Use of Films", Visual Aids Review, 1, 2, April 1949, p. 26; and Brown, R.D., "A Comparison of the Relative Effectiveness of Black & White & Colour in Instructional Films", Visual Aids Review, 1, 1, 1949, p. 5.

(4) Radford, W.C. (1960), Symposium on Mass Media in Australia, Chap. 4, Sect. III, Yearbook of Education, Evans Bros., London.

(5) See Linz, C.C., "The Future of Audio-Visual Education", Education Gazette, New South Wales, 59, April 1965, 124-126, and "The Pedagogical Filmstrip in New South Wales, Education Gazette, 59, August 1965, 222-225; Read, H.J., "Teaching Aids Centre", Tasmanian Teacher, March 1966.

(6) Australian Vice Chancellors' Committee, "Teaching Methods in Australian Universities", Report of the Committee, 1965, pp. 203-213.

Education Departments. The Australian Broadcasting Commission had been established in 1932 and there immediately began a co-operative venture with the State Education Departments which has persisted and flourished. In 1933 the A.B.C. conducted a survey(1) in Victoria of those children in correspondence schools who had access to radio sets. As the proportion was 40 per cent, a broadcast period was allotted for the use of correspondence education. This was the beginning of a unique and distinguished record of the integration of educational broadcasting (both radio and T.V.) with educational organisations which has spread within and outside Australia. One example of this, born of the risks of the war years. was the setting up in 1942 of the "Kindergarten of the Air"(2) in the pre-school sphere, which subsequently stimulated similar moves in the B.B.C., Canada, Norway, New Zealand and New Guinea.

With the surge of interest in education in the immediate post war years, the Commonwealth Government assumed more responsibilities for education at the national level, and in 1945 the Commonwealth Office of Education was established. Amongst other things, it acted as a research and promotion agency, in co-operation with the State Education Departments, for the mass media of film, radio, and later television, in education. It also acted as an agency for Unesco's International programs in mass communication and for compiling surveys of Australian activities in the field of educational technology for various international bodies.

(b) The Newer Educational Media:

(i) Radio

It was natural that, because of the size and distribution of the school population, and the centralised organisation of the school system in Australia, school radio broadcasts would have a big part to play. The earlier co-operation be tween the Australian Broadcasting Commission and the State Education systems grew rapidly, and there was an extensive development of school broadcasting in the post war years. With the opening of new regional stations, there was an increase in schools equipped with radio from 82 per cent of national schools in 1956 to 93 per cent in 1960. A survey conducted by the Australian Broadcasting Commission, with the aid of the State Education Departments, showed a marked increase in the extent to which school-broadcasts were being used in rural areas, particularly in one-teacher schools, with some schools using as many as 19 or 19 programmes a week.

The Commonwealth Office of Education(3) and the A.C.E.R. (4)both reported details of this growth up to 1959, showing its close connection with school curricula

(1) See "Educational Broadcasting", Education Department, Australian Broadcasting Commission, 1965.

(2) Ibid.

(3) Commonwealth Office of Education, "Education in Australia", Bulletin No.20 (5th edition), 1959.

(4) "Review of Education in Australia, 1940-48", A.C.E.R., Melbourne, 1949.

and especially with the correspondence system. Radford[1] comments on the enrichment value of these school broadcasts and the flexibility of the system in coping with the fact that more than half the schools in Australia were in the country, many being in remote areas. In this latter case, the value of the broadcasts for direct teaching where specialist teachers are not available is pointed out by Bull[2].

An opportunity for Australia to review its own position in radio school broadcasting, and to compare it with other world developments, arose at the Rome International Conference[3] in 1961. Here it was able to report on the surge of post war activities in this field and some characteristic developments in Australia such as the School of the Air. In an up-to-date description of radio school broadcasting, both within and outside Australia, Watts[4] claims it to be one of the best systems in the world and to be making a great contribution to education in the Pacific area.

Post-War Developments

The Australian Broadcasting Commission constituted under the Australian Broadcasting Control Board and financed by money from the Federal Parliament, is an independent national body and is responsible for providing radio broadcasts to schools.[5] It is assisted by an Advisory Committee of the Directors of the State education systems who have their own advisory committees representative of educational bodies in the State. Committees of practising teachers assist the school broadcast officers of the A.B.C. in planning for the production of the programmes. This collaboration and decentralisation has given opportunity for local experimenting and testing in a large number of widely varying centres throughout Australia before the material is presented on the network. On the other hand, centralisation in the A.B.C. has permitted the Federal Government to fulfil its educational responsibilities at the national level in some unique ways, both internal and external to Australia. The programmes are broadcast through a system of metropolitan and regional medium wave stations and domestic short wave stations in one of the largest radio networks in the world. Educational broadcasts are also beamed from Radio Australia in various languages to many countries, but particularly to the South East Asian area.

Internal Broadcasting

Internally, programmes have been planned in direct relation to courses of study, but not directly as a technique for a classroom lesson. The intention has rather been

---

(1) Radford, W.C. (1960), "Symposium on Mass Media in Australia", Ch. 4, Section III, Yearbook of Education. Evans Bros., London.

(2) Bull, C., (1962), "School Broadcasting in Australia", Education News, 8, 19, pp 7-10.

(3) Proceedings of the International Conference of Broadcasting Organisations on Sound and T.V. School Broadcasting, Radiotelevisione Italiana, Rome, 1961.

(4) Watts, F. (1965), "The Role of Radio and Television" in "Australia and Its Neighbours", Australian College of Education, Cheshire.

(5) For full details of the A.B.C. organisation, administration, history, and functioning, see "Educational Broadcasting", Australian Broadcasting Commission, revised ed., 1965.

to "break down the walls of the classroom, and bring the world in". In broadcasting to primary and secondary schools there is close collaboration of teachers and producers on educational content, and there is a good blend between broadcasts of local and national character. While they are intended primarily to supplement and enrich the curriculum there have been some critical and evaluative sessions and some direct teaching in mathematics and science, languages and music. Illustrated booklets are provided for background to the broadcasts for the children and special notes for the teachers.

Educational radio broadcasting in Australia covers the whole range of age groups, from kindergarten to the university and mature adult learners. Mention has already been made of the Kindergarten of the Air, which is a nationwide link-up and an international broadcast over Radio Australia. It is in the primary school (ages 7 years to 12 years) that most use is made of educational broadcasts and where Australian radio is making its greatest contribution: Sessions on English, Music, Social Studies and Health and Hygiene are closely related to school curricula. In the secondary school (particularly from 13 to 16 years), General Science and Foreign Languages are added and some instructional as well as supplementary sessions are given.

At the tertiary level, the Royal Melbourne Institute of Technology acts as a Radio Centre for Victorian schools and broadcasts and short-wave throughout South Eastern Australia for the Education Department's correspondence school system. Pioneering work in university and postgraduate studies has been carried out by the University of New South Wales over Radio University[1] broadcasting on a special wave length from transmitters in large country towns as well as from Sydney. This is now well established and a special group of general practitioners and other medical specialists is catered for in the Medical School of the Air.[2]

Educational radio broadcasts at the adult level have been very specifically related to community needs. Internally a series of rural broadcasts are given in adult and extension courses to demonstrate and apply new techniques, especially in agriculture[3]. An area in which Australia has a distinguished record is that of language teaching by means of radio, particularly the teaching of English to migrants, to the indigenous people of Papua-New Guinea, and to the South East Asian peoples.

---

(1) See Morgan, H.G. (1965), "Brain Waves", Secondary Teacher, March, pp.16-19.

(2) Shaw, J.H. (1965), "The Medical School of the Air", Medical Jnl. Aust., 1 June, pp. 869-871.

(3) For details see Brown, H.P. (1962), "Agricultural Extension Services in New South Wales", Education News, 8, 9, pp. 14-16, and Commonwealth Office of Education, "Education through Rural Broadcasts", Education News, 8, 9 (1962) pp. 11-12.

Special National and International Contributions

On the national front, Australia has made a number of unusual contributions resulting from an attempt to solve problems of educational radio broadcasts in the unique set of circumstances previously referred to. The Australian Federal Government participating at the national level in the two "extremities" of education (pre-school and adult) not only provides educational radio broadcasts internally but also for its Territories and at the international level through various agencies.

The Role of Radio in the Correspondence School

Symptomatic of its geographical problems, both internal and external, and of the close integration achieved with the school systems, has been the remarkable development of the use of radio in correspondence education in Australia(1). The 1933 survey revealed, as mentioned above, that 40 per cent of correspondence school pupils had access to radio sets. In order to meet the special problems of these outback children, special periods on the air were allocated to them. The intention was to bring "the personal touch" and "a sense of belonging to a school community", to these isolated children. The sessions were designed from the start to deal with specialised aspects of the correspondence course itself, that is, direct instruction. Printed materials in relation to the course were issued and special sessions were broadcast for their supervisors (usually the parents). But the children were encouraged to use the normal school broadcasts also, and later special programmes were provided to help them broaden their outlook and enrich their experience through "sound created pictures". By 1964, over 95 per cent of Australian schools were using radio broadcasts and this included almost all the remote one-teacher schools in the country.

The School of the Air

An even more remarkable facet of radio's contribution, amounting almost to a saga, was that made possible through the radio network of the Royal Flying Doctor Service and the Bush Church and Flying Medical Service. In the heart of Australia, isolated homesteads are connected to one another and to the outback base hospital by powerful two-way radio transceivers. For the major part of the time, these are not in use for medical and flying services and the outback homes make contact with a school in the locality.

> "In a centre where there is a Flying Doctor Service, a link is made with a room in the local school. This is set up as a studio, and at certain times during the day the teacher of the air calls in the pupils of her school over

---

(1) The origin and growth of this movement is well documented in (a) International Conference of Broadcasting Organisations on Sound and Television School Broadcasts, Proceedings, Rome, 1961, and (b) Commonwealth Office of Education, "Education by Correspondence in Australia", Bulletin No. 28, 1963, and (c) Rayner, S.A. (1949) "Correspondence Education in Australia", A.C.E.R., Melb.

the Flying Doctor Radio Service, and in homesteads scattered over thousands of square miles, individual children, seated in front of radio transceivers, listen to their teacher and are able, by flicking over a switch, to answer her questions or to ask for explanations of difficulties they have encountered. The basic school work for these children is provided by the Correspondence School of the appropriate State Education Department, but the personal contact and explanations are provided by the teacher of this School of the Air.

Thus, not only can these children ask and answer questions, or show what they have learned of song or story, they can also, from hundreds of miles away, hear the bell for the grades of their 'home school', they can hear the murmur of the voices and the tread of other children's feet. They can sing with a class, or write their spelling and their answers to mental arithmetic and then correct their work.

This School of the Air appears to be occupying a significant place in Australian education. It is sweeing its scattered pupils into a classroom, even though it is not one made with hands. The tival interplay of teacher with child and child with others is at least present in feeling as well as imagination. It is this social education that is the vital thing in School of the Air. Only those who have known the isolated child or family of the out-back can understand all the disabilities of such isolation in a child's formative years. The School of the Air brings children together, stimulates interest, breaks down indifference, arouses emulation and does something to bring the individual into the company of his own generation."(1)

There are now ten of these "Schools of the Air" functioning in Australia in close relation with the correspondence education systems.

Radio and Language Teaching

At first language teaching by radio was restricted to the traditional language teaching of French and German. In the post war years, the Commonwealth was faced with the problem of teaching English as a foreign language to an influx of migrants. With the assistance of the Commonwealth Office of Education, the unique and well known session "Say It With Paul" became very popular. More recently, a course integrating both radio and correspondence work has been offered combining both audio and visual material, the latter in the form of accompanying printed and illustrated material. This course also blends vocabulary, grammar and practice in the four language skills into an integrated course which is very effective.

English lessons for Indonesian and Thai listeners are beamed from Radio Australia.(2)

(1) Australian Broadcasting Commission, "Education.Broadcasting", Melbourne, 1965.

(2) See Commonwealth Government Participation in Education, Education News, 8, 9 1962, and 7, 4, 1959

The course is meant for Secondary School students who want to consolidate and develop the English language. Illustrated booklets are issued to accompany the broadcasts and over 200,000 copies of these booklets have been issued free to those requesting them. Finally, extensive work in language teaching by radio is being done in Papua-New Guinea where English is being taught to the indigenous population, particularly with pre-school children.(1)

Services External to the Country (International)

It is in this field of language teaching by radio in its territories and overseas as well as to migrants that Australia has already been able to extend assistance to developing countries in the South-East Asian area. For example, the Commonwealth Office of Education with its experience in producing texts and aids for language teaching to migrants will increasingly be able to contribute to the work of Unesco programmes in mass communication. Projects have already begun for the training of teachers in radio broadcasting and in producing experimental materials and kits for use with this medium. Australia's experience in specially designed radio receivers and transmitters and its experience in related correspondence techniques could help solve problems in educational broadcasting in remote villages overseas. Cassirer(2) has suggested Unesco's role in promoting the use of mass media in this way and it is not difficult to envisage the implementation of such plans by a country such as Australia which has solved many similar problems in its own way.

Evaluation of Educational Radio

As mentioned earlier, co-operation between the Australian Broadcasting Commission, the State Education Departments, and teachers in the schools has been very close and has taken the form of Advisory and Planning Committees. This has resulted in high production standards as well as ensuring that the broadcasts are relevant to the school syllabuses. This highly decentralised functioning has also encouraged variety of approach and a willingness to experiment. Feedback on the effectiveness of the learning is obtained through report cards and questionnaires and by two-way visits, correspondence and conferences.

A supervisory control of standards of the broadcasts is maintained by the Sydney Head Office. A policy is followed of carefully examining each aspect of broadcasting and bringing each field under frequent scrutiny and revising programmes when necessary. Programmes are appraised in the studio by the teacher and by specialist observers of their effectiveness in the classroom. In order to review the extent of use of the broadcasts as well as the need for modifications, a Radio Evaluation Committee conducts surveys and investigations. It collects data on numbers and nature of classes, schools and pupils listening

---

(1) Cameron, A., "Pre-School of the Air in the Territory of Papua and New Guinea", Australian Pre-School Quarterly, 5, 1965, p. 36

(2) Cassirer, H.R. (1964), "Promotion of Educational and Cultural Radio", Visual Aids Review, 3, pp.24-35.

to various programmes and why they listen.

In the 1964 Tokyo Conference[1] Australia reported progress on various aspects of educational radio broadcasting but the emphasis was on uses and development rather than evaluation by research and experimentation. Recently an attempt was made to get listeners' views on the standard and suitability of the course for Indonesians by inviting them to return a questionnaire, and this also revealed useful information on their age, sex, occupation and geographic distribution. Finally, the Commonwealth Office of Education has acted as a research agency for evolving suitable selected materials for the broadcasts, particularly for the teaching of English as a foreign language.

Most of the evaluation of educational radio broadcasting is of the kind mentioned above and there has been little systematic research into its effectiveness. Staff and students of university Education Departments and teachers' colleges have reported projects in this field, and some State Education Departments have actively investigated radio broadcasting. An experimental study of some methodological issues was carried out by the Queensland Institute for Educational Research in 1955[2]. At a stage when a more concerted evaluation of education by radio might have been expected, attention was diverted to teaching by television.

(ii) Educational Television

With the advent of educational television, there was, fortunately, an organisation already functioning efficiently at the national level, and co-operating fully with the State educational systems in educational radio broadcasting as outlined above. After the inauguration of television services by the Australian Broadcasting Commission in 1956, there was a growing interest in its educational potential and in 1958 an experimental series of twenty-four television programmes was provided for forty selected secondary schools in Sydney and Melbourne. After favourable evaluation, this led to Stage I of the national plan which provided a daily service to these cities. When television was extended to the States, Stage II was implemented with a daily service to all capital cities. By 1963 Stage III provided a service to provincial city areas and educational television passed beyond the exclusively experimental stage.

A feature of educational television in Australia has been the planning and experimental approach referred to above. In the initial experimentation, provision was made for reporting back by questionnaire and some controlled experiments were carried out. A working party was established by the Australian Broadcasting Commission and State Directors of Education, and reports were

(1) Second International Conference of Broadcasting Organisations on Sound and Television School Broadcasts, Proceedings, N.H.K., Tokyo, 1964.

(2) Queensland Institute for Educational Research, "An Experimental Investigation of Method in School Broadcasting", p. 5 (mimeo.), 1955.

received from the various States on the extension of the services in the three stages mentioned.[1] The experience of this five-year experimental period resulted in some consolidation and was followed by a series of enquiries into the future of educational television in Australia to be reported below.

In the experimental period referred to, there was an opportunity to explore various techniques of program presentation in a new and complicated medium as well as experiment with a broad field of subject matter and age range. It was a chance to experiment also with programs that could be closely interwoven with school curricula as well as providing supplementary material or enrichment. As in the case of educational radio, a working partnership grew up between the Australian Broadcasting Commission, the various Education Departments, and the schools. This was a period too when the novelty value wore off prior to a period of constructive criticism and positive suggestions for improvement. One result of this experimental period was that the Federal Advisory Committee recommended a shift in emphasis to direct teaching by television in the secondary schools, particularly in mathematics and science.

Because of the rather systematic approach to planning and development of educational television, activities and progress in this field are fairly well documented. The publications of the Australian Broadcasting Commission and the Program Services Division of the Australian Broadcasting Commission Control Board[2] contain full accounts of progress from its inception to the present time, and details of the activities and developments in each of the stages up to 1962 are given in the "Review of Education in Australia"[3] and the Annual Reports of the Ministers of Education of the various States. Other factual and evaluative accounts are contained in various national and international yearbooks from 1958 onwards[4] based on reports supplied by the Commonwealth Office of Education acting as a national agency. A report on Australian activities in educational television to the First Rome Conference in 1961[5] made reference to the various stages of development provided for, and a comprehensive account of progress

---

(1) The machinery for this kind of co-operation had already been established in the Federal Advisory Committee on School Broadcasting, assisted by the State School Broadcasts Advisory Committees within each State, and the Planning and Appraisal Committees to advise on detailed planning.

(2) See (a) Australian Broadcasting Committee Control Board; Program Services Division, Information Service, "Educational Programs Televised by Australian Television Stations, 1957-64", Melbourne, 1965 and "Bibliography of Selected Literature on Educational Television", Melbourne, Revised 1966; (b) Australian Broadcasting Comm., "Educational Broadcasting", Sydney, 1964.

(3) See Australian Council for Educational Research, "Review of Education in Australia, 1955-62", Melbourne, 1963.

(4) See the International Yearbook of Education, the Yearbook of the Commonwealth of Australia, and the Commonwealth Universities Yearbook.

(5) Op cit.

made was reported to the Second Tokyo Conference in 1964[1]. Finally, there is a wealth of detail and statistics provided in reports of numerous special ad hoc committees, of professional bodies, and reports of Committees of Enquiry at the State and Federal levels [2] into educational television.

Development and Application

After the developmental period referred to, there was a consolidation of television services at the various levels of education though still partly experimental and evaluative. Because of the value seen in its use as direct instruction and because of pressing needs, much attention has been given to the Secondary and Tertiary levels. There has been progress with both telecast lessons by the Australian Broadcasting Commission and with the use of closed-circuit systems in Secondary schools[3] and universities.

(a) The Primary and Secondary Schools

In the earlier years of telecasting, the bulk of the programmes was directed to the Primary school where conditions for integration and planning were more flexible than in the Secondary schools. The use of television in the Primary school has been mainly for enrichment - the letting in of the outside world, to stimulate and add variety.[4] However, there has been some extension to television of the direct teaching type in Natural History which was begun in the earlier radio sessions. During the morning, sessions ranging from "Play School" for infant classes to various topics for the Junior school are given in all States. In one State[5] every Primary and Secondary school uses at least one television receiver.

Ever since the Federal School Broadcast Advisory Committee of the Australian Broadcasting Commission recommended that the greatest need for help in schools was for the teaching of science and mathematics, educational tele -

---

(1) Op cit.

(2) A particularly good summary of Australian Educational Television up to 1964 is given in Australian Broadcasting Control Board, "Report of the Advisory Committee on Educational Television Services", (Weeden Report), Commonwealth of Aust., 1964.

(3) Some good examples of the practical uses of such systems can be found in New South Wales, Victoria, and Tasmania.

(4) See Lukeis, R.M. (1966), "Television in the Primary School", Australian Journal of Education, 10, 2, pp.186-187, for an account of Victorian activities.

(5) Tasmania.

vision in the Secondary schools has been instructional in nature as well as providing enrichment. There is also an increasing tendency to provide for direct teaching of languages, especially of Asian languages. The prevailing idea was to use this mass media for the spread of the qualified teacher in these areas of specialisation in a time of crisis of numbers, explosion of knowledge and shortage of staff. In the initial phases, each of the State Education Departments, through their Technical Colleges and Institutes of Technology, were experimenting both with T.V. courses and with equipment suitable for use in the schools in closed-circuit systems. There was a specially planned series during 1964 for direct teaching of mathematics and science and, with reports of favourable reactions(1) these are being extended. A balance is being aimed at between intensive production for instruction and the stimulation of a lively presentation by a skilled teacher. An even greater opportunity to use direct methods in television teaching was taken by the closed-circuit systems installed in various Secondary schools(2). Reports indicated that they permitted scope for experimentation, resulted in better preparation of material, and that results were comparable with, or better than, ordinary teaching.

(b) The Tertiary Field

While no tertiary education institution has a telecasting system of its own, nevertheless, applications of educational television in the tertiary field cover a wide variety of activities in both open and closed circuits and serve many purposes. They range from telecasts to the intelligent lay public, and post-graduate extension courses in co-operation with the Australian Broadcasting Commission, to its use as a mass teaching device and specialised teaching tool in closed-circuit systems within the universities themselves. While open telecasting preceded the use of closed-circuit teaching systems, the latter have now developed considerably as will be shown later.

The University of the Air

The first instance of the use of television open circuit in the tertiary field was the inauguration of the "University of the Air" in 1961(3). Enlisting the services

---

(1) Reports on these telecasts have been provided by the Education Departments of the participating States whose Directors General of Education represent them on the Federal School Broadcast Advisory Committee of the Australian Broadcasting Commission.

(2) For reports of these see, Kempson, F.A. (1962), "Education Through Television", Royal Melbourne Institute of Technology, Melbourne; Foster, G. (1963) "A Report on a closed-circuit television teaching experiment at G.V. Brooks High School", Launceston; and Driver, S.C. (1965), "A Victorian School uses Closed-Circuit Television: Experiments and Experiences at Mt. Scopus College", Visual Aids Review, 3, 13-16; 30.

(3) For detailed accounts of the "University of the Air", see Watts, F. (1965), "The Two-fold Australian Approach", Ed. Broad Union Review, Nov., pp.46-48, and "Educational Broadcasting", Australian Broadcasting Commission, Sydney, 1964, pp.37-43.

of the Australian universities, this was an attempt in documentary form to bring university education in an interesting way to a wide audience of intelligent Australian people. It was regarded as a university extension course rather than popular adult education, but the reaction of the public was remarkable. In the first week in Sydney alone, 4000 letters and telephone calls were received, and 46,000 copies of a brochure giving background notes and reading lists are distributed for each telecast series. Audience research has revealed that the main categories of viewers range from university groups through graduates, adult education and professional groups to the intelligent lay public widely spread over the viewing area.

The second type of television teaching for adults is the school-university bridging courses begun in 1964 and conducted jointly by the Australian Broadcasting Commission and the University of New South Wales, Sydney. This is an example of direct teaching of mathematics and science subjects for students about to enter first-year university studies and intended to make the transition more satisfactory.

Finally, in the wider field of adult education, by means of television, little has yet been done. An informal session, "Television Tutorial", is conducted and occasional "Teach Ins" are arranged. Recent reports suggest that further thought is being given to developments in this field(1), including a proposal for a national educational television network.

Use of Closed-Circuit Television

The operation of closed-circuit television systems for teaching in Australia is, of course, outside the scope of the Australian Broadcasting Commission, being handled by private institutions and schools. It has been quite a recent development and still only at the experimental and developmental stage, but there are indications of a more rapid rate of growth in the very near future.

The first operational intra-mural system for mass university teaching was commenced at the University of New South Wales in 1962 on an experimental basis, and later was extended to cope with the teaching of large numbers of students mainly in First Year subjects.(2) This was followed by the University of Sydney after an experimental period of two or three years.(3) With these two systems providing working models and in the light of experience gained, other

---

(1) See Davies, J., "Some Thoughts on Informal Educational Television", Aust. Journal of Adult Education, 5, 1965, pp.50-57; Australian Assoc. of Adult Education "Television & Adult Education", proceedings of Fifth Annual Conference, 1965, Sydney.

(2) For a full report see Short, L.N., "The Use of Television in the University of New South Wales", paper to ANZAAS, Hobart, 1965.

(3) For details of the installation, operation and recent developments see McLaine, A.G., "The Use of Closed Circuit T.V. at the University of Sydney", Univ. Sydney Gazette II, No. 1962, pp58-59; "Installation of C.C.T.V. in the University", Univ. Sydney Gazette II, Nov. 1964, p. 118; Stewart, C.P. & Burman, D.W., "Tertiary Education by T.V. at the University of Sydney", Telev. Soc. Jnl. 2, 4, 1965, pp.86-89.

universities and Institutes of Technology in Australia are enquiring into costs, equipment and facilities prior to establishing systems of their own.

A study of teaching methods in Australian universities carried out by the Australian Vice-Chancellors' Committee in 1963[1] revealed that, while there was little interest generally by individual departments of the universities, there were isolated examples of its use, mainly for demonstration purposes and to avoid duplication of lectures.

More recent accounts and enquiries about the use of closed-circuit television reveal a growing interest. Individual departments within many universities are using smaller industrial video loop systems for special teaching purposes. Examples are demonstrations in the Physical and Biological Sciences and direct observations and video recordings of patients in Psychology and Psychiatry for teaching purposes. In medical education, surgical demonstrations in colour T.V. have been experimented with, and the Royal Melbourne Institute of Technology has developed a system enabling the televised teacher to control the use of the camera.

In the field of teacher education, the universities and teachers' colleges are beginning to capitalise on the potential of television for observation of children, for testing techniques, and for demonstrations of teaching methods. Some of the newer universities are considering linkages by co-axial cable to adjacent primary and secondary schools, one is using a mobile production unit, and some teachers' colleges and university Education Departments are using, or planning to use, closed-circuit systems for student self-evaluation and for research into pupil and teacher interaction in the classroom[2]. Very recently, in-service courses for teachers of instructional television and for T.V. script writing and production have been held.[3]

Recent committees of enquiry at both the State and Federal levels have made special reference to the use of television for tertiary education[4]. Recommendations have been made at the national level that both intra-mural

---

(1) op. cit.

(2) A notable example is the work at Toorak Teachers' College reported in Brophy, L. (1963), "Closed-Circuit T.V. and Teacher Training", Visual Aids Review, 3, p.8; 3, 1964, pp.8-9; 34; 3, 1965, pp.28-29; Botsman, P.B. (1964) "Closed-Circuit T.V. in Teacher Education", Ed. Magazine, 21, pp.484-489.

(3) Foster, G. (1965), "T.V., Another Aid for Teachers", Tasmanian Education Dept., and "Instructional T.V. - Contribution to Education", Curric. News, 4, 1965, pp.56-68; Education Department, Western Australia: Annual Report of the Director of Education, Perth, 1964.

(4) See Commonwealth of Australia, Australian University Commission, "Tertiary Education in Australia", Report of the Commission on the Future of Tertiary Education in Australia, 1964; and the Committee for the Development of Tertiary Education in Victoria, "The Development of Tertiary Education in Victoria, 1963-72", Report and recommendations, Melbourne, 1963.

and extra-mural services should be developed and extended. In a particularly enlightened report, the Committee for the Development of Tertiary Education in Victoria advocated its widespread and intensive use in spite of its greater costs. They considered that it improved the quality of teaching, promulgated good teaching more widely, and made learning easier. Suggestions were made as to how students might be involved more in the sessions and how the sessions might be integrated with tutorial and other procedures. They recommended increased grants, improved organisation, and advised that a special channel be allocated for educational television in Victoria.

(c) Research and Development

Most of the reported research on educational television has been of the survey or service type associated with developing use of the medium in the schools. At the time that television was commenced in Australia, there were some studies carried out in the universities' Schools of Education and Psychology of its likely effect on school children generally and particularly on their adjustment and leisure activities(1). As television became established in the school system, there was, as mentioned above, a fairly active period of evaluation and experimentation resulting in a number of reports by State Education Departments and teacher organisations(2). These studies were a direct outcome of the setting up by the Federal Advisory Committee of the Australian Broadcasting Control Board of a Working Party on Experimental School Television to carry out an observational and experimental evaluation of school television programmes. The most extensive review and investigation reported to 1963 was that carried out by the State Advisory Committee on School Broadcasts in Queensland(3) which revealed that television was at least as effective as conventional methods and should be extended.

After initial research in establishing and developing the system, subsequent studies were more concerned with the problem of integrating television sessions with the on-going school system and with evaluating the functioning of the system.

---

(1) See Thomson, R.J., "Television Crime-Drama, Its Impact on Children and Adolescents", Cheshire, Melbourne, 1960;
Campbell, W.J., "Television and the Australian Adolescent", Angus and Robertson, Sydney, 1962; and
Connell, W.F., "Growing Up in an Australian City", A.C.E.R., Melb., 1957.

(2) For example see Australian Teachers' Federation, "Report by Western Australia on the 1962 Australian Teachers' Federation Television Motion", Perth, 1963, and Anders, D.J., "Educational Television, 1963", Report of South Australian Institute of Teachers, 1963.

(3) Queensland State Advisory Committee on School Broadcasts, "Teaching by Television; an experimental evaluation in Queensland schools", Brisbane, 1963.

In a series of studies[1] reporting on the effectiveness of the direct teaching of science subjects, observations were made, surveys conducted, and questionnaires given to both staff and students. Such matters as the need for greater student participation, the alteration of timetables, and articulation with other teaching activities were emphasised. So favourable was the impression of the value of television teaching that recommendations took the form of "fundamental steps needed" ranging from suggestions for improved facilities to the development of production methods and training of teacher-producers.

More recent evaluative surveys and investigations[2] of the impact of television viewing on primary and secondary school children emphasise both the positive and negative role of educational television in promoting "identification", stimulation, and activity, and the need for effective "feedback" reports in this area of study. Reports of the effectiveness of the use of television at the tertiary level are few and mainly confined to surveys by questionnaires of the attitudes of students toward the medium. In two reported studies[3] in Education and Engineering, the results were found to be as good or better than conventional methods and the attitudes of the students were favourable.

Surveys at the National Level

Even before the commencement of television in Australia, a Royal Commission[4] had pointed out, in 1954, the potential of television as a teaching device and recommended experimental work with it. As a result of the ferment of activity in the schools in the trial period from 1958-1963, two enquiries were undertaken. The first was that of a Select Committee of the Senate of the Federal Government[5] (appointed in 1962 and report issued in 1965) which created a lot

(1) "Science and Mathematics Telecasts", Curriculum News, 4, 1965, pp.114-115; "Television in Secondary Schools - Report on Experimental Programmes", Education Circular, 67, 1965, pp.41-43; "The Production of Television Lessons in South Australia", South Australian Teachers' Journal, 16, 1965, pp. 11-13; "School Broadcasts, 1966", Department of Education, Western Australia, 1966.

(2) Campbell, W.J., "The Impact of T.V. on Primary School Children", Aust. Jnl. Educ., 9, 1965, pp.95-105; Lukeis, R.M., "Television in the Primary School", Aust. Jnl. Educ., 10, 1966, pp.186-187; and Australian Psychological Society, "Final Report of the Working Party on Mass Media", A.G.M., Melbourne, 1966.

(3) Maclaine, A.G., "An Experiment with Closed Circuit T.V. at the University of Sydney", Aust. Jnl. Educat., 3, 1963, pp.157-164, and Driver, S.C., "Teaching Engineers by Closed Circuit T.V.", Visual Aids Review, 3, 1963, pp.13-16; 22-23.

(4) Commonwealth of Australia, "Report of the Royal Commission on Television", 1954.

(5) Commonwealth of Australia, "Report of the Select Committee to investigate Television in Australia", (Vincent Report), 1965.

of controversy and resulted in a national congress of educationalists in 1965 calling upon the Government to implement the recommendations of the Report[1]. Meanwhile, because of the need to survey the evaluate resources and consider lines of development in educational television, the Broadcasting Control Board appointed an Advisory Committee[2] in 1964 to examine present conditions and needs and advise on future developments. The report of this Committee stated that educational television programmes were unco-ordinated, not planned in accordance with the requirements of the educational authorities, and reflected the interests of the organisations producing them. Among other things, it recommended that educational television be integrated with the educational system, that a separate authority be established for its organisation and functioning, and that special educational T.V. channels be allocated. After delays and considerations by the Federal Government, the above recommendations were not implemented.

The most recent report on educational T.V. is that of a Commission in New Guinea[3] enquiring into the usefulness of television and radio in overcoming some unique communication problems in a developing country. Suggestions were made for the use of direct instruction to overcome a shortage of skilled teachers, and it was stressed that there was an urgent need for communicating skills and information on languages, health, and science to indigenous peoples by means of an integration of radio and television techniques. Again the recommendations of this Committee have not been implemented.

(d) Current Developments

The submission of reports to the above mentioned committees of enquiry, together with the activities already developed in the schools, has generated an attitude of critical evaluation and planning in the field of educational television in Australia. This has been assisted by comparisons with overseas developments by two-way exchange of visitors. On the one hand, there are suggestions[4] of the need for greater teacher involvement in using the medium

---

(1) For background to the controversy, see (a) N.S.W.: Education, 46:60, 1965; (b) Victoria: Victorian Teach. Jnl. 48, 1965, pp.81-83; 128-131; (c) South Australia: Sth. Aust. Teach. Jnl., 16, 1965, pp.3-8; (d) West. Australia: Parent & Citizen, 9, 6, 1965; and (e) Tasmania: Tasman. Teacher, 16, 1965, pp. 10-11; Also Broadbent, D. (1965), "Educational Television", Education , 48, pp.47-48.

(2) Australian Broadcasting Control Board, "Report of Advisory Committee on Educational Television Services", Commonwealth of Australia, 1964.

(3) Papua-New Guinea: "Report of the Commission on Television in Papua and New Guinea", Port Moresby, 1966.

(4) See Bull, C., "Teaching by Television", Aust. Jnl. Ed. , 8, 3, 1964, pp. 171-182, and Rosenthal, N., "Educational T.V. and the Schools", Visual Aids Review , 3, 1965, pp.3-4

for direct instruction - growing from their experience of teaching and learning rather than using it as a novelty or for ad hoc purposes. On the other hand, the immediacy and motivational aspects of T.V. are stressed[1] where the influence of a good teacher can be multiplied and used for enrichment in an open circuit system. On a wider plane, it is considered[2] that Australia is not shouldering its responsibilities in educational television, especially in the universities, and that with relative small effort and expense there could be considerable development. Finally, at a meeting in Paris in 1966, at which Australia was represented, it was considered[3] that education had much to gain in long term planning to promote the use of space communication by satellites.

(e) International Obligations.

In considering its obligations, as in educational radio, at the national and international levels, Australia has also explored possibilities in television. Internally it is planning to extend coverage to more remote areas and possibly to New Guinea. The latter raises the matter of education by mass media to promote literacy and spread the qualified teacher. Though there is no illiteracy problem in Australia, she is already involved in schemes such as the Colombo Plan and the Technical Co-operation Scheme in relation to Unesco, mainly dealing with educational radio.

A growing association with Asian countries has led to planning for language teaching by means of television, and a central training school has been established in Sydney for the training of students from Africa, Asia, and New Guinea in the specialised techniques of radio and television teaching. This centre will also produce media for use in developing countries and will provide advice and technical assistance in the South East Asian area, somewhat similar to the Centre for Educational Television Overseas in Britain. No doubt Australia will extend to this area the idea of the exchange of material for teaching History and Geography for World Understanding already sponsored by the Educational Broadcasting Union.

PROGRAMMED INSTRUCTION

The stimulus for activities in programmed instruction in Australia came, of course, from reported developments in the United States and Britain. As in the case of most countries, there was an initial flush of enthusiasm followed by a period of uncertainty, and then steady growth and consolidation. Demands for information were so great in the early stages that the Australian Council for

---

(1) See Harris, J., "Television in Schools", Victorian Teachers Jnl.,, 1965 pp.81-83; 128-130

(2) See Broadbent, D., "Educational Television in the University", Vestes, 8, 1965, pp. 37-45

(3) Bednall, C., "Education Through Space", Information , 17, 3, 1966, pp. 3-4

Educational Research issued a handbook[1] in 1962 and offered to act as a clearing house for information. In an effort to co-ordinate activities and interests, the University of New South Wales held a conference[2] at Sydney in 1963 out of which grew the Association for Programmed Instruction catering for both educators and industrialists. Reviews of progress made since that time[3] show steady but relatively slow and diffuse developments.

Most applications of programs to education have been of the "Classroom trial" type and there has been little systematic application in schools or the education system generally. The main reason for this is that available programs have been produced overseas and are not entirely suited to Australian curricula. The style of presentation of this material is still relatively unfamiliar and unacceptable to many students and teachers. However, there has been a recent trend in programs produced in Australia towards making the programs approximate more closely to ordinary school practices and to tailor them more closely to the curriculum. Such materials are in kit form, able to be used in a group and blended with other classroom practices, yet retaining most of the features of and incorporating the principles of programs.

Because of the prevailing experimental and exploratory approach, applications are spread sporadically throughout all levels of education and in individual schools, mostly outside the State Education Departments, and mostly sponsored by research groups in the universities and the A.C.E.R.[4]. The use of suitable overseas programmes and those produced locally have been found to be helpful and effective and there is a slowly growing awareness of the value of the materials and the technique generally.

---

(1) Keeves, J. (1962), "Survey of Programmed Instruction", Aust. Council for Educational Research, Melbourne

(2) University of New South Wales, Educational Research Unit, "Introduction to Programmed Instruction", Report of a Conference, 1963, Sydney

(3) See Connor, D.V. (1965), "Programmed Instruction in Australia and Great Britain", Programmed Instruction, 4, 7, pp.1-11, and Australian Council for Educational Research, "Programmed Instruction in Australia, 1965", Information Bulletin No. 2, Series No. 44, 1965.

(4) For a sample of reports on their use at all levels see Renwick, A., "Programming Composition in Infant Grades", N.S.W. Educational Gazette, 59, 101, 1965; Gaudry, E. and Selleck, A.J., "An Investigation of Programmed Spelling in Two Victorian Primary Schools", Australian Journal of Education, 9, 1, 1965, pp.13-28; Driver, S.C., "Programmed Instruction in Action", Visual Aids Review, 3, 1965, pp.6-9; Hunt, H. and Keeves, J.P., "An Exploratory Study of the Value of Programmed Instruction in Dependent Clauses in Latin", A.C.E.R., 1965; Spillman, J.J., "The Development and Evaluation of a Tertiary Level Program in Engineering Mechanics", Programmed Instruction Bulletin, 1, 3, 1966; and Connor, D.V., "A Programmed Instruction Bridging Course in Mathematics for First Year University Students", Programmed Instruction Bulletin, 1, 3, 1966.

An example of the general and specific educational role played by programming techniques is seen in the part it played in the recent change-over to decimal currency in Australia, though the main impetus came from industry. Programs have also been used successfully in some departments of universities, mostly for revision and remedial purposes. The real blockage, however, is the lack of suitable programs and the inability or unwillingness at this stage to deploy the large resources of staff and finance necessary to prepare them. Most attempts at program writing have been made by individuals in relation to their own teaching tasks and some program writing workshops have been held. Two positive results have accrued from these efforts - one is that beneficial effects to conventional teaching have been felt, and the other is that programs close in style and procedure to conventional teaching have emerged. Course work in program writing in relation to teachers' college courses has also had a beneficial effect on teacher training.

One particular area of the technology of education that has received wide attention is the use of the language laboratory. The oral-aural approach in language teaching has commended itself, the equipment was available, though expensive, and teaching tapes from overseas were highly desirable and more universally applicable. There has been a pleasing amount of use of this equipment in secondary schools but limited by the cost of equipment and the academic approach to language teaching. Most universities are using the equipment in their language teaching departments, and in some cases making wider use of it in Modern Language Teaching Centres and Institutes.

In this field, however, it is perhaps in the more specific aspects of teaching at the adult level that Australia has made a special contribution both in equipment and techniques. Pioneering studies in language teaching at the R.A.A.F. Academy at Point Cook, Melbourne, have pre-dated world developments and have evolved "instantaneous response" tape decks, remotely controlled by multiple motors, and this system has been found to result in more effective learning and to be more acceptable to both students and instructors.(1)

Another example is the work of the Commonwealth Office of Education at its English Teaching Centre, where English as a foreign language is intensively taught by language laboratory equipment to Colombo Plan students and other sponsored students at educational instutions in Australia(2). Finally, a "two-way" use of language teaching is being carried out by the use of language laboratory equipment to teach English to native New Guinea peoples(3) and to teach the New Guinea languages of Pidgin and Motu to Australians

---

(1) Garrick, A.J. and Jordan, T.C., "The Conventional and Instantaneous Response Systems in Language Laboratories", Programmed Instruction Bulletin, 1, 3, 1966.

(2) Commonwealth Office of Education, "The English Teaching Centre at Work", Educational News, 9, 5, 1963, pp.8-9.

(3) Schubert, E., "The Language Laboratory and its Implications for Papua and New Guinea", Papua and New Guinea Journal of Education, 3, 1965, pp. 102-106.

working in their midst.[1] A teaching machine designed to teach English as a foreign language has been tried out on aboriginals and is also being considered for use in New Guinea.[2]

Much of the literature on programmed instruction in Australia comprises descriptive and explanatory articles "about" the new technique though there have been some critical reviews.[3] However, because of the exploratory and experimental approach mentioned earlier, research efforts, though fairly numerous, are informal, widely scattered, and still mainly at the "survey and evaluation" stage. A review of the experimental research[4] to 1965 reveals some controlled studies[5] and further systematic Australian projects are reported elsewhere.[6] Some original work is using multiple channels in radio and television for branching procedures has been reported[7] and a comparison of group presentation by means of a closed-circuit television and individual pacing by programmed texts has been made.[8] Since computers with the necessary storage capacity and control functions are now available, some work in computer-assisted instruction has begun in at least five Australian universities. The use of the computer in this way will provide a valuable adaptive research tool for more controlled studies of learning. Because of the need for further evidence on learning and teaching by this technique and because the technique itself is an ideal tool for future probing in this field, it is possible that, in the absence of suitable programs for application, the main thrust will still be on further experimental evaluation and research.

In Australia, as elsewhere, the main barriers to rapid expansion of the use of programmed instruction would seem to be difficulties involved in

---

(1) Munro, D.J., "The University of Queensland Institute of Modern Languages", Education News, 10, 10, 1966, pp.9-11

(2) See Ross, N., "A Teaching Machine for Territory Schools", Australian Territories, 6, 1966, pp.37-40.

(3) Cohen, D., "Programmed Instruction and Teaching Machines", Australian Journal of Education, 8, 1, 1964, pp.7-17; Balson, M., "A Critical Review of the Application of Learning Theory to Programmed Instruction", Australian Journal of Education, 9, 3, 1965, pp.215-224.

(4) Keeves, J.P., "Notes on Learning and Programmed Instruction", A.C.E.R. 1965.

(5) For example Selleck, R. and Gaudry, E., "Programmed Spelling - A Second Investigation", Australian Journal of Education, 9, 2, 1965, pp. 155-60.

(6) See Programmed Instruction Bulletin, Vol. 1, Nos. 1-3, 1965-66

(7) See PATOR and PATATEL in Broadbent, D., "The University of New South Wales Extension Studies with particular reference to the Use of Radio and TV", Proc. Third National Conference, Australian Association for Adult Education, 1963.

(8) Connor, D.V., "The Presentation of Programmed Material on Closed-Circuit Television", Programmed Instruction Bulletin, 1,1,1965, pp.8-12.

producing materials appropriate to the school systems whose curricula are in a state of flux. The necessary finance, staff materials and skills could only be provided by large organisations in co-operative group ventures or by the collaboration of educational and publishing institutions. This would be feasible at a State level because of the highly centralised systems of education and with an increasing demand from individual classroom teachers. With the present accelerated trend towards individualising and diversifying educational procedures in Australia, an effort to delegate part of the teaching task to programs would help to solve some difficult problems. The alternative and probably more fundamental and long-term approach in terms of improvement of teaching and learning would be to encourage practising teachers to construct programs themselves from small facets of their teaching tasks, after a brief period of training in program writing.

APPLICATIONS OF TEST TECHNOLOGY

Concurrently with the emergence of the various educational media, the testing movement in Australia was stimulated by American and British developments and its growth was accelerated by the problems of the war years(1) and fostered on the educational side by the universities and the Australian Council for Educational Research.

The selection and rehabilitation problems in the Forces led to increased post-war activity in student selection, mostly at the university level(2), and to a real interest in guidance and later in clinical applications to special disabilities in education. Radford(3), in reviewing the period up to 1956, gives a comprehensive coverage of the application of this testing movement in various fields of education in Australia, and the extent to which tests have been widely applied in data gathering in education is shown by the Social Science Research Council's later survey(4). The application of tests for both measurement (research) and clinical work in education spread rapidly with the growth of the A.C.E.R.(5) and the setting up of Research and Guidance Branches in the

(1) For a review of testing in the Forces during these years, see McElwain, D. (1950), "A Review of Psychology in Australia", Occupational Psychology, 24, pp.141-152

(2) See Hohne, H.H. (1951), "The Prediction of Academic Success", Aust. Council for Educational Research, Melbourne, and Sanders, C. (1961), "Psychological and Educational Bases of Academic Performance", Research Series No. 74, A.C.E.R., Melbourne.

(3) Radford, W.C. (1957), "Educational Research in Australia, 1950-56", Australian Journal of Education, 1, 1, pp.45-54.

(4) Social Science Research Council of Australia, "Bibliography of Research in the Social Sciences in Australia", 1958.

(5) See Annual Reports of the Australian Council for Educational Research for detailed and up-to-date accounts of their application to both research and professional practice.

State Education Departments[1]. Parallel with this, courses in testing and measurement, guidance, and diagnostic and remedial testing were provided by the universities, and these skills were gradually extended to educational practice generally. Finally, the Commonwealth Office of Education played a role at the national level in selection procedures and in constructing and applying tests for language teaching and other educational purposes both internally and externally to Australia.

With regard to the application of test technology to professional educational practice, the Guidance Services of the State Education Departments locally and the A.C.E.R. on a wider plane carry out considerable testing programs, and offer advisory services. Apart from conventional testing, guidance and clinical work, such devices as reading rate controllers, reading eye cameras, audiometers, acoustic aids and equipment for other special disabilities are being widely used for both educational and teacher training purposes. State Education and other Government Departments and Counselling Units of the universities provide a specialised service for students. The Commonwealth Office of Education uses disc recordings for administering selection and diagnostic tests in the English language for foreign students intending to study in Australian educational institutions. Some universities are experimenting with the use of objective-type tests to measure performance and reliability of assessing students' progress[2]. Because of the highly centralised and relatively uniform development of the school system in Australia, such practices can be introduced more quickly and smoothly than otherwise.

OTHER ASPECTS OF EDUCATIONAL TECHNOLOGY

As well as the testing movement mentioned above, and in addition to the mass media approach of audio-visual aids, radio, television, etc., there have been some recent significant developments in educational technology such as the use of the computer, telephone and land line relays, information storage and retrieval systems, and facilities in libraries.

Because of the large capital investment and staff resources involved, the use of the computer as a tool in education has been confined almost entirely to the universities, except where it is used routinely as an administrative and data processing device. Bennett[3] has made a survey of computing centres in the

---

(1) See "Review of Education in Australia, 1940-48; 1949-54; 1955-62", A.C.E.R., Melbourne, for an account of their establishment and development, and the Annual Reports of the Ministers of Education of the various States for details of their activities in the school system; also Commonwealth Office of Education, "Educational and Vocational Guidance Services in Australia", Bulletin No. 14, (4th ed.), 1962.

(2) The University of New South Wales has installed test score readers in the Educational Research Unit.

(3) Bennett, J.M. (1962), "Computer Science in Australian Universities", submission to Committee on Tertiary Education set up to advise the Australian Universities Commission.

universities up to 1962, and elsewhere[1] deals with the use of the computer for administrative, training, and research purposes, outlining present trends and indicating future developments. The Australian Universities Commission, in projecting Australia's needs during the period 1961-66[2], proposed a national scheme of large central and satellite computers.

On the administrative side, computers are being used for setting up timetables and examination dates, and recording and evaluating student progress, but their most widespread use is as a direct teaching, training and research tool. The application of computers to teaching grew originally from their use as calculating and control devices for research. Specially designed computers at some of the universities have generated the desire and need for digital equipment designed more specifically for educational purposes, both undergraduate and graduate.[3] Course work in programming and use of the computer is provided in all the universities, both for teaching about the computer and facilitating its use as a research and problem solving tool.[4] Recently there has been a good deal of interest shown in developing time sharing systems using multiple remote consoles for teaching engineering design, decision making, and for intensive instruction of subject matter and other skills.[5] This latter has also provided the possibility of intensive study of students learning and problem solving behaviour .

The growth of knowledge and information, together with the "student bulge" has created difficulties not only in communicating by means of the mass media but in storing and making such knowledge available to widely scattered school systems at the time and place it is needed. Educational technology has assisted by providing information storage and retrieval systems which take many forms. Firstly, the co-ordinate method of referencing has been adopted by indexing groups in order to make educational literature more readily available.[6] These approaches are the forerunners of the use of the computer to make searching and selection of such literature more efficient. Secondly, libraries are increasingly

---

(1) Bennett, J.M. (1963), "Electronic Data Processing - the Universities Role" The Australian University, 1, 2, pp. 171-195.

(2) Australian Universities' Commission, Report of Australian Universities' Commission on Australian Universities, 1961-66, 1963, Ch.V.

(3) For example of one application see Wong, D.C., "Laboratory Equipment for Teaching Digital Computer Fundamentals", Inst. Radio & Electrical Engineers, Aust. Proc., 26, 1965, pp. 77-83

(4) For an account of the work of the Basser Computing Dept., see Bennett, J.M., "Sydney University Training for Electronic Data Processing", address to a Conference on "The Graduate in Electronic Data Processing", University of Sydney Appointments Board, 1964, Sydney.

(5) For a comment on the Australian scene see Hunt, E.B., "Computer Science and Services", Vestes, 8, 1965, pp.27-34.

(6) For example see Fitzgerald, R.T. (1966), "A System of Handling Information on Australian Education", Memo 1, Series 3, A.C.E.R.; and Australian Higher Education Information Centre, Educational Research Unit, University of New South Wales, 1966.

storing information on microfilm, tape and discs and making such information available in specially equipped carrels. An extension of the use of such stored material is the University of Melbourne's group project with other universities in providing study materials on audio and video-tape to science departments with excessive teaching loads.

Another unique solution to Australia's vast spaces problem is the use of telephone networks and land line systems in educational ventures. These have been closely related to the correspondence system and to post-graduate and external studies at the universities. The trans-continental telephone system between Adelaide and Darwin has been used in transmitting special correspondence radio broadcasts by means of lines laid from the local post office to the most remote schools of the outback. Correspondence lessons of the Victorian Education Department have also been carried on land line in Victoria by the Royal Melbourne Institute of Technology(1). Recently the University of Queensland initiated a telephone network to allow students in many country towns to question the lecturer within the University directly during the course and to participate in the discussion at the end of the lecture. Coppelson(2) also describes an experimental transmission by land line for post-graduate medical education where the major hospitals in Sydney were linked in a telephone network. Finally, a recent international educational conference of the New Education Fellowship on "How Can Education Advance Friendship in a Divided World" was held by a telephone hook-up between Australia and New York.

THE POSITION IN NEW ZEALAND

The influences affecting the development of educational technology in New Zealand are very similar to those operating in Australia. However, it is smaller, more isolated, less populous (though more uniformly populated), less highly industrialised, and has remained closer to its British origins than Australia. New Zealand, unlike Australia, was developed by a number of separate regional settlement schemes and its education system has tended to remain decentralised with a strong local tradition in education.(3) In the last few decades, however, a strong trend towards centralisation and nationalisation has occurred and this

---

(1) Commonwealth Office of Education, "Education by Correspondence in Australia", Bulletin No. 28, 1963.

(2) Coppelson, V. M. (1963), "Land-Line Network for Australian Post-Graduate Medicine", World Medical Journal, 10, p. 174.

(3) Background descriptions and recent developments can be found in Unesco, "Compulsory Education in New Zealand", Paris, 1952; Unesco, "World Survey of Education, Vols. I-IV", Paris, 1956-1961; International Bureau of Education, "International Yearbooks of Education", Vols. 22-24, Geneva, 1960-1964; Association of Commonwealth Universities, "Commonwealth Universities Yearbook", London, 1964-1966; and Yearbooks of Education, Evans Bros., London, 1960-1966.

has assisted in the more widespread use of the various media in education.

As in the case of Australia, documentation of developments in educational technology has been sporadic and scattered among a number of publications, mainly in annual reports and professional publications of the New Zealand Education Department, the professional teachers' organisations, the New Zealand Broadcasting Corporation, and the New Zealand Council for Educational Research. Further information on educational technology is given in accounts prepared for the international publications mentioned below, in reports of two international conferences (Rome and Tokyo)(1) on Educational Broadcasting, and in two enquiries into education at the national level(2).

In these publications, reference is made to the New Zealand Education Department's Audio Visual Aids and Film Centre and the National Film Library which produce slides, film strips and films and encourage their extensive use.(3) Some contributors to the Education Department's Journal "Education" decry the superficial use of these materials and the lack of teaching about film appreciation. Extensive use is made of illustrations, diagrams and well prepared textbooks in the Technical Correspondence School of the Education Department.(4)

New Zealand is a rural country and has used educational radio to overcome some of its problems of scattered and remote school populations, particularly in relation to correspondence education. Additionally, radio broadcasts have been the means of bringing unity and a national status to the otherwise local outlook of the Regional Boards. The New Zealand delegates to the Rome and Tokyo Conferences have reported recent progress(5) in educational broadcasting. Developments have been similar to those in Australia, with some special attention being given to correlating the audio-visual aids, museum and library services with school broadcasting. Special emphasis is placed on listener research by means of questionnaires and visits of the broadcasting staff to schools. New Zealand is also playing an increasing role with assistance and information on school broadcasting to developing countries in the Pacific and South East Asian areas. As yet there is no reported work on the use of television in the schools other than planning, preliminary trials and pilot research projects.

---

(1) op cit.

(2) Report of the Committee on New Zealand Universities, N.Z. Govt. Printer, Wellington, 1959, and Report of the Commission on Education in New Zealand, Govt. Printer, Wellington, 1962.

(3) For an account of their use in the school system see Section 14, Chap. 6, "Modern Teaching Aids", in "Report of the Commission on Education in New Zealand" quoted above.

(4) Lee, B.C., "The Technical Correspondence School of the New Zealand Education Department", Sec. IV, Ch. 6, Yearbook of Education, Evans Bros., London, 1960.

(5) Allen, D.A., "The Aim of School Broadcasts in New Zealand", Proceedings of Second International Conference of Broadcasting Organisations N.H.K., Tokyo, 1964.

At the tertiary level the conventional audio-visual aids such as slides, films and tape recorders have been used in the various teaching departments, and in some cases there are Teaching Aids Committees for the University as a whole. Recently a Society for Audio Visual Education has been formed with the aim of "closing the gap between advances in technology and teaching practice". Further moves are also being made by the universities and teachers' colleges to extend the use of educational television, mainly closed-circuit, for demonstration and teaching purposes, for teacher training, and for research. A number of the universities has held staff seminars on teaching methods, during which the applications of technology to education have been considered.(1)

The application of educational technology in the form of objective testing has been fostered by both the universities and the New Zealand Council for Educational Research. The former includes tests and measurements and experimental education in its course work, while the latter produces objective tests for research and use in the education system.(2) There has been fairly extensive use of tests by the Psychological Division of the Education Department and the N.Z.C.E.R.(3), and by students doing theses in the universities. Recently there have been some applications of programmed instruction in the schools and universities, particularly in the use of language laboratories, but its use generally is as yet fairly limited. Most of the universities are using computers for administrative procedures, and for teaching purposes in some of the teaching departments, and an educational information retrieval system is being developed by the N.Z.C.E.R.(4)

Since New Zealand is not a highly industrialised country, applications of technology to education have not been extensive and consequently research activity in this area is not widespread. Similarly, course work in educational technology in the universities has not been emphasised.(5) Isolated cases of the use of data gathering devices and techniques for research are reported(6) but

---

(1) For example, see Victoria University of Wellington, "Staff Seminars on Teaching Methods and Standards", Report of Proceedings, Wellington, 1963.

(2) See the Annual Reports of the New Zealand Council for Educational Research.

(3) For one application see Parkyn, G., "Success and Failure at the University, Vol. I, Academic Performance and the Entrance Standard", New Zealand Council for Educational Research, Wellington, 1959.

(4) See Borland, R.H., "Information Handling and Communication Problems", Part I and Part II, New Zealand Council for Educational Research, 1965.

(5) An interesting exception is a course in Principles and Technology of Teaching offered by Massey University, Palmerston North.

(6) For example, the University of Otago project on the "Impact of Educational T.V. on Children"; Adams, R.S., "The Classroom Setting, a Behavioural Analysis", unpublished Ph.D. Thesis, University of Otago, 1966; and Nuthall, G.A. and Lawrence, P.J., "Thinking in the Classroom", New Zealand Council for Educational Research, Wellington, 1965.

devices and the technologies other than film and radio have not been widely incorporated in professional practice in the classroom. There have been expressions of opinion by New Zealanders[1] that the scientific and technological advances of their century have caught educational institutions unprepared, and that research in this area has been diffuse, fragmented, and discontinuous[2] and has not supported educational planning.

TRENDS AND EVALUATION

The above review of the various applications of educational technology in Australia and New Zealand indicates considerable growth which has paralleled developments in technology generally in the period following the two world wars. Any attempt to evaluate this growth must depend upon its documentation and upon research in this field. Documentation that is readily available consists mainly of descriptive reports but these show fairly widespread activity and indicate various trends. A better indication of quality and effectiveness of these developments comes from research reports[3] but these are few in number, and predominantly of the survey type rather than reports of experimentation. Evaluation of progress must therefore be largely general and subjective.

Generally speaking, however, it can be said that the period to date has been one of informal experiment, the establishment of services, and general applications to various educational levels. Much of the period has been preoccupied with the solution of problems of geography and a scattered population and administrative and organisational difficulties attendant upon this. These conditions have demanded a rather wide-scale approach and a creative action-research approach rather than application to specific teaching tasks. Because of this wide coverage of a unique set of conditions, evaluation of efficiency and effectiveness has been neceassarily more gross than intensive.

It will be seen that the concept of an educational technology applied to the classroom is still a fairly broad one in Australasia. It is an approach which recognises that the various branches of science and technology are increasingly providing tools for educational use, not necessarily in a specialised way, but as devices that have motivating value or that enrich the curriculum; devices that spread the gospel rather than penetrate the system. This rather gross "ad hoc" use has yet to be refined by the more complete integration of these techniques into ordinary teaching procedures or even by some conscious recognition of a rationale that makes them central to learning and teaching and not merely empirical aids. It is perhaps too much to expect the majority of Australian and New Zealand teachers, with their relatively unspecialised training, to see these developments as fundamental contributions from learning theory and technology, but it is only an increased recognition of this that will remove

---

(1) Report of the Committee on New Zealand Universities, op, cit.

(2) Watson, J.E., "The Role of Research in Educational Planning in New Zealand", Jnl. Ed. Admin., II, 2, 1964, pp.108-124.

(3) Listings of the research can be found in the Annual Reports of Research of the Universities, the A.C.E.R. and the Commonwealth Office of Education.

these devices from the realm of "rule of thumb", or mere novelty, to their role of direct teaching as well as enrichtment.

In analysing the effect of automation on education generally, Denning[1] noted an awakening in Australasia of fresh and positive attitudes towards things technological and scientific. Against a background of increased industrial development in Australia, Galbraith[2] noted this effect on the education system but considered that the latter should accommodate more quickly. In contemplating possible changes or increases in the application of educational technology to education in Australasia, difficulties seem to stem from lack of information and know-how, and lack of resources to implement what is desirable. For many reasons, ideas, devices and procedures in educational technology come generally from outside the system, are unfamiliar and often unsuited to Australasian conditions. Educationalists in Australia and New Zealand have tended not to capitalise on what educational technology has to offer and to be content with teaching procedures tied to concepts justified on historical and traditional grounds. Value judgements are quite often mistakenly made about the techniques themselves rather than the purposes for which they are being used, and there is thus an initial attitude of resistance. Additionally, the gap between theory and practice has been wide; as between universities and other teacher training institutions, there has been less emphasis on specialisation, and research into learning in the classroom has not been widespread or intensive.

However, with an educational system increasingly geared to a modern developing industrial nation, these things should be quickly remedied. Any lack of growth from the "grass roots" can be offset by the ease with which new procedures can be introduced "at the top" because of the highly centralised systems of the Australian States. The attitudes and shortcomings in information, skills and expertise in this field could be overcome if the paucity of course work and research in Australasia referred to above could be remedied. If this were supported as it must be by the growing desire on the part of the community for development and allocation of funds in this field, Australia and New Zealand could be both proving grounds and a shop window mid-way between the British and American approaches and with expectancies of some original contributions of their own.

With regard to the possibilities of such a trend there is the promise that, once the facilities provided by an educational technology have been established, the next needed step is to use them more effectively, and this is the position that Australia and New Zealand now seem to have reached. Indeed, part of the attempt to use them more effectively has resulted in interesting modifications to the technology itself and likewise to the educational setting and procedures into which the technology is introduced. This two-way process or integrating point of view is already occurring in the case of programmed instruction, and the extension of this to other educational technologies seems limited only by the deployment of time and resources and by the well recognised conservatism of the teaching profession.

---

(1) Denning, A., "Automation and Education", Australian Teacher, January 1958, pp. 9-13.

(2) Galbraith, J., "The Age of Automation", address to International Congress on Human Relations", Melbourne, May, 1965.

Two responsible groups of educators(1) have recently pointed to the diminishing discrepancy in a scientific and technological context, between the growing needs and demands of the educational communities in Australasia and the capacity of the nation to meet them. This recognition of the importance of science and technology to the development of the country, backed by increased potential to finance it, seems to herald the next step - a"spilling over" of this outlook to education generally and a more sustained application of educational technology to the classroom in particular. As mentioned above, Australia has already used such technology to solve some educational problems in a difficult set of circumstances, and it may well be that this, together with its highly centralised educational system, will lead to more rapid developments than elsewhere in this field. If this happens, Australia and New Zealand, with their international roles and outlooks in the Pacific area, may be able to bring these newer educational technologies to bear on problems where traditional or conventional procedures could not possibly succeed.

---

(1) See Australian Education Council, "A Statement of Some Needs of Australian Education", Report of the State Ministers of Education, 1963; and Australian Universities Commission, "Second Report of Australian Universities' Commission on Australian Universities, 1961-66", 1963.